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Applicant/Proprietor:	ROBERT BOSCH GMBH, 70469 Stuttgart/DE
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Windscreen wiper device for a motor vehicle

Description

The invention relates to a windscreen wiper device for a motor vehicle with at least one wiper bearing and a fastening element that is connected to the vehicle body, a decoupling element for decoupling noise being arranged between the at least one wiper bearing and the fastening element.

Pedestrians are completely unprotected in collisions with vehicles. In particular, the unyielding, hard parts beneath the bonnet often produce severe injuries when there is an impact between a pedestrian and a vehicle. The windscreen wiper device is located in an area where pedestrians frequently hit a vehicle in an impact. The windscreen wiper devices generally known from the prior art have the disadvantage that they represent a great danger of injury for a pedestrian in an impact with the vehicle.

The object of the invention is to improve a windscreen wiper device of the type mentioned at the outset to the effect that in future the danger of injury for a pedestrian in an impact with a vehicle is reduced.

The invention achieves the stated object through a windscreen wiper device for a motor vehicle with at least one wiper bearing and a fastening element that is fastened to the vehicle body, a decoupling element for decoupling noise being arranged between the at least one wiper bearing and the fastening element, and, according to the invention, the decoupling element and/or the wiper bearing is detachably connected to the fastening element. Because of the detachable connection of the decoupling element and/or the wiper bearing to the fastening element, the decoupling element and/or the wiper bearing can be detached from the fastening element by the impact of a pedestrian, with the result that the decoupling element and/or the wiper bearing give way during an impact, and thus reduce the pedestrian's risk of injury in an impact with the windscreen wiper device.

In a development of the invention, the fastening element and/or the decoupling element are provided with an undercut, the fastening element and/or the decoupling element being manufactured from a deformable material. The undercut on the fastening element and/or on the decoupling element effects locking of the decoupling element on the fastening element in an axial direction of a wiper bearing shaft. This locking is necessary to guarantee the proper functioning of the windscreen wiper device when it is in operation. Because the fastening element and/or the decoupling element are manufactured from a deformable material, the locking between the fastening element and the decoupling element can be released, despite the undercut, in the case of a pedestrian impact with the vehicle. As a result, the decoupling element and/or the wiper bearing yields to the impact. Consequently, the pedestrian's risk of injury is reduced considerably.

The undercut can be achieved in a structurally very simple manner by means of a material projection in the end area of the fastening element. This material projection can advantageously be designed as a thickening. The impact force required to detach the decoupling element from the fastening element is defined as a function of the size of the thickening.

In order to be able to dissipate the impact energy uniformly and not jerkily, the material projection in the end area of the fastening element can have a plurality of teeth arranged one behind the other. When the pedestrian impacts the windscreen wiper device according to the invention, the impact pushes the decoupling element over the successively arranged teeth, and the teeth generate a relatively high frictional force opposing the impact force during the displacement of the decoupling element. As a result, the impact energy is converted to thermal energy and thus dissipated.

In another embodiment of the invention, the undercut can have a hook-shaped end area of the decoupling element. During the impact, the wiper bearing can be pressed against the decoupling element in this hook-shaped end area, with the result that during the impact

the wiper bearing together with the decoupling element is displaced along the wiper bearing shaft and thus detached from the fastening element.

In order to be able to better define the force required to release the locking between the decoupling element and the fastening element, a disk can be arranged between the material projection in the end area of the fastening element and the hook-shaped end area of the decoupling element. For the same reason, it is also possible for the undercut on the fastening element to have an oblique bearing surface on which the disk or the decoupling element rests. The force to detach the decoupling element from the fastening element can be defined as a function of the angle of this oblique bearing surface.

It is expedient if there is a displacement path between a wiper arm and the fastening element before impact with the windscreen wiper device.

For reasons of optimum deformability during the impact, the decoupling element can be manufactured from a plastic, in particular an elastomer. For the same reason, it is also possible to manufacture the fastening element from a plastic. It also makes sense, for reasons related to easy manufacturability of the relatively complicated form of the decoupling element and of the fastening element, to manufacture the decoupling element and the fastening element from a plastic.

In order to achieve cost savings in the case of large-scale manufacture, and in order to optimize process control in the case of a highly automated manufacturing concept, it is advantageous if the at least one wiper bearing and/or the fastening element and/or the decoupling element are standardized non-variable parts.

Various illustrative embodiments of a windscreen wiper device according to the invention are explained below in greater detail with reference to the enclosed drawing.

In the drawing:

Fig. 1 shows a perspective top view of a windscreen wiper device according to the invention;

Fig. 2 shows an exploded view of the windscreen wiper device from Fig. 1;

Fig. 3a shows a side view of the windscreen wiper device from Fig. 1 before an impact with a pedestrian;

Fig. 3b shows a side view of the windscreen wiper device from Fig. 1 after the impact with the pedestrian;

Fig. 4 shows a sectioned view of the windscreen wiper device from Fig. 3a along the line B-B;

Fig. 5 shows a sectional view through a second embodiment of the windscreen wiper device according to the invention;

Fig. 6 shows a detailed view of a detail in the end area of a wiper bearing from Fig. 5;

Fig. 7 shows a sectional view through a third embodiment of the windscreen wiper device according to the invention;

Fig. 8 shows a detailed view of a detail in the end area of a wiper bearing from Fig. 7.

Figs 1, 2, 3a and 3b show a windscreen wiper device 100 with a wiper arm 10, which is connected to a wiper bearing 12 by means of a wiper bearing shaft 11. A crimp peg 13 to accommodate a mounting plate tube (not shown here) is arranged on the wiper bearing 12. A fastening element 14 is attached above the wiper bearing 12 and this fastening element can be used to fasten the windscreen wiper device 100 according to the invention to a vehicle body (not shown here either). A decoupling element 15 for decoupling noise is provided between the fastening element 14, which is fastened to the vehicle body, and the wiper bearing 12. The decoupling element 15 is inserted axially into the wiper bearing 12 during assembly. The fastening element 14 is inserted, likewise axially, into the decoupling element 15 (see Fig. 2). As can be seen in Fig. 2, the fastening element 14 has webs 20 which can be inserted into openings 21 in the decoupling element 15 during assembly. The

decoupling element 15 has webs 22 which can be inserted into openings 23 in the wiper bearing during assembly. Since the decoupling element 15 and the wiper bearing 12 are detachably connected to the fastening element 14, an impact force F can press the wiper arm 10 downwards by a displacement path 15.

Fig. 4 shows a windscreen wiper device 400 with a wiper shaft 40, on which a wiper arm 41 is mounted. The wiper shaft 40 is supported in a wiper bearing 42. A decoupling element 43 is mounted on the wiper bearing 42 and a fastening element 44 is arranged on the decoupling element 43. The fastening element 44 has a thickening 45, around which a correspondingly formed undercut 46 on the decoupling element 43 engages. The undercut 46 and the thickening 45 thus form a means of locking the decoupling element 43 to the fastening element 44. This locking depends on the strength of the thickening 45 and the undercut 46. The decoupling element 43 furthermore has a hook-shaped end area 47. The wiper bearing 42 is supported on this hook-shaped end area 47 during the impact. As a result, the wiper bearing 42 can displace the decoupling element 43 downwards during the impact. During the downward displacement of the decoupling element 43, the decoupling element 43 with its undercut 46 is pushed over the thickening 45. The thickening 45 and the undercut 46 thus determine a detachment force required to release the locking means formed by the thickening 45 and the undercut 46. Since the decoupling element is frequently manufactured from an elastomer, the force required to release the locking between the thickening 45 and the undercut 46 depends not just on their dimensions but also on the hardness of the elastomer.

Figs 5 and 6 show a windscreen wiper device 500 with a wiper bearing 50, a fastening element 51 and a decoupling element 52. A disk 53 is arranged between the fastening element 51 and the decoupling element 52. The disk 53 is locked in the downward axial direction by a thickening 54. In the case of an impact, the wiper bearing 50 together with the decoupling element 52 is pressed downwards, as a result of which the disk 53 is

pushed over the thickening 54, thus releasing the locking.

Figs 7 and 8 show a windscreen wiper device 700 with a wiper bearing 70, a fastening element 71 and a decoupling element 72. Arranged between the decoupling element 72 and the fastening element 71 is a disk 73. Teeth 74 arranged one behind the other extend beneath the disk 73. In the case of an impact with a pedestrian, the wiper bearing 70 together with the decoupling element 72 and the disk 73 are displaced downwards. During this displacement, the disk 73 is pushed over the successively arranged teeth 74, with the result that the impact force is counteracted by an increased frictional force. As a result, the impact energy is converted to thermal energy and thus dissipated in a uniform manner. The frictional force counteracting the impact force can be specified in accordance with the inclination of the flanks of the teeth 74.

PATENT CLAIMS

1. Windscreen wiper device (100, 400, 500, 700) for a motor vehicle with at least one wiper bearing (12, 42, 50, 70) and a fastening element (14, 44, 51, 71) that is connected to a vehicle body, a decoupling element (15, 43, 52, 72) for decoupling noise being arranged between the at least one wiper bearing (12, 42, 50, 70) and the fastening element (14, 44, 51, 71), characterized in that the decoupling element (15, 43, 52, 72) and/or the wiper bearing (12, 42, 50, 70) is detachably connected to the fastening element (14, 44, 51, 71).

2. Windscreen wiper device (100, 400, 500, 700) according to Claim 1, characterized in that the fastening element (14, 44, 51, 71) and/or the decoupling element (15, 43, 52, 72) are provided with an undercut, and the fastening element (14, 44, 51, 71) and/or the decoupling element (15, 43, 52, 72) are manufactured from a deformable material.

3. Windscreen wiper device (100, 400, 500, 700) according to Claim 2, characterized in that the undercut is a material projection in the end area of the fastening element (14, 44, 51, 71).

4. Windscreen wiper device (400, 500) according to Claim 3, characterized in that the material projection in the end area of the fastening element (44, 51) is embodied as a thickening (45, 54).

5. Windscreen wiper device (700) according to Claim 3, characterized in that the material projection in the end area of the fastening element (71) has a plurality of teeth (74) arranged one behind the other.

6. Windscreen wiper device (400, 500, 700) according to one of Claims 2 to 5, characterized in that the undercut is a hook-shaped end area (47, 55, 75) of the decoupling element (43, 52, 72).

7. Windscreen wiper device (500, 700) according to one of Claims 2 to 6, characterized in that a disk (53, 73) is arranged between the material projection in the end area of the fastening element (51, 71) and the hook-shaped end area (55, 75) of the decoupling element (52, 72).

8. Windscreen wiper device (400, 500, 700) according to one of Claims 2 to 7, characterized in that the undercut on the fastening element (44, 51, 71) has an oblique bearing surface on which the disk (53, 73) or the decoupling element (43) rests.

9. Windscreen wiper device (100, 400, 500, 700) according to one of Claims 1 to 8, characterized in that there is a displacement path (15) between a wiper arm (10) and the fastening element (14, 44, 51, 71) before an impact with the windscreen wiper device (100, 400, 500, 700).

10. Windscreen wiper device (100, 400, 500, 700) according to one of Claims 1 to 9, characterized in that the decoupling element (15, 43, 52, 72) is manufactured from a plastic, in particular an elastomer.

11. Windscreen wiper device (100, 400, 500, 700) according to one of Claims 1 to 10, characterized in that the fastening element (14, 44, 51, 71) is manufactured from a plastic.

12. Windscreen wiper device (100, 400, 500, 700) according to one of Claims 1 to 11, characterized in that the at least one wiper bearing and/or the fastening element (14, 44, 51, 71) and/or the decoupling element (15, 43, 52, 72) are non-variable parts.

ABSTRACT

Windscreen wiper device (400) for a motor vehicle with at least one wiper bearing (42) and a fastening element (44) that is connected to a vehicle body, a decoupling element (43) for decoupling noise being arranged between the at least one wiper bearing (42) and the fastening element (44), the decoupling element (43) and/or the wiper bearing (42) being detachably connected to the fastening element (44). (Fig. 4)

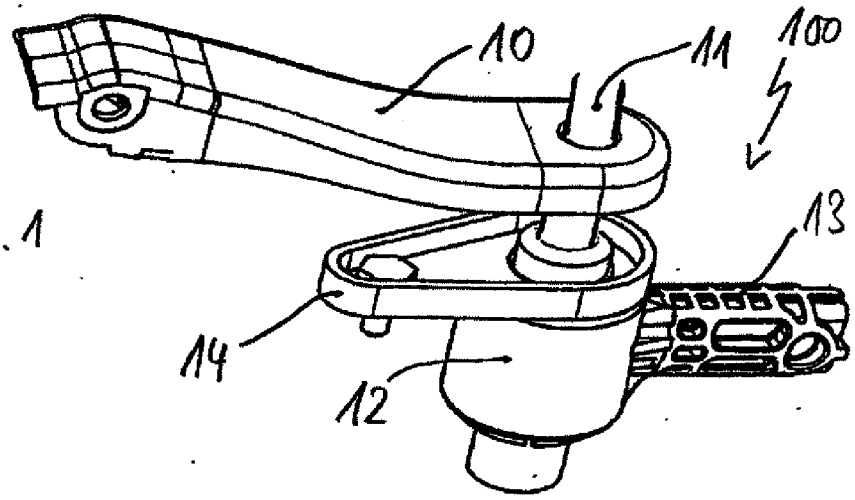

Fig. 1

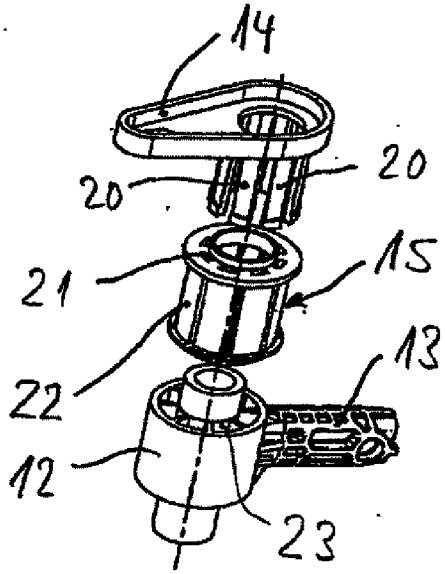

Fig. 2

Fig. 3a

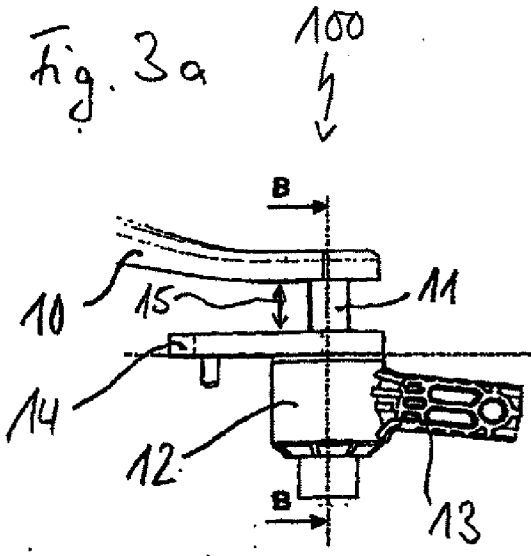

Fig. 3b

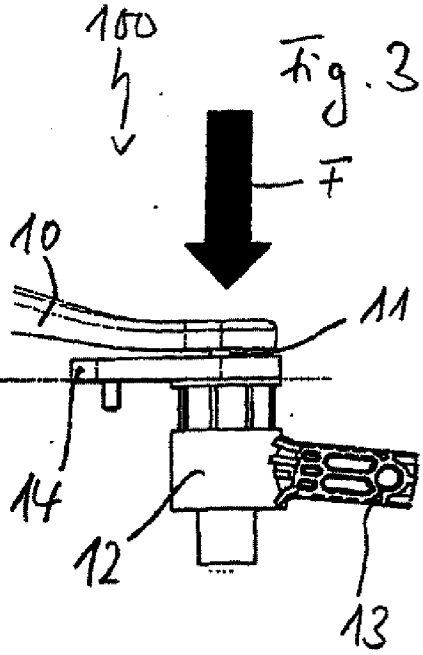

Fig. 4

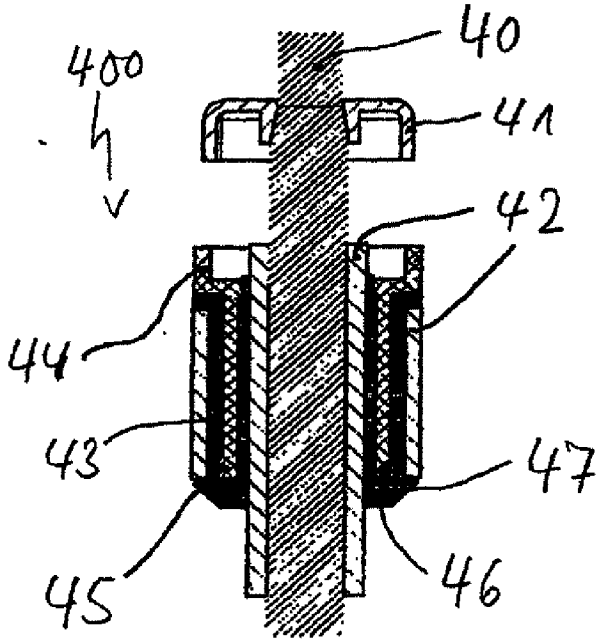

Fig. 5

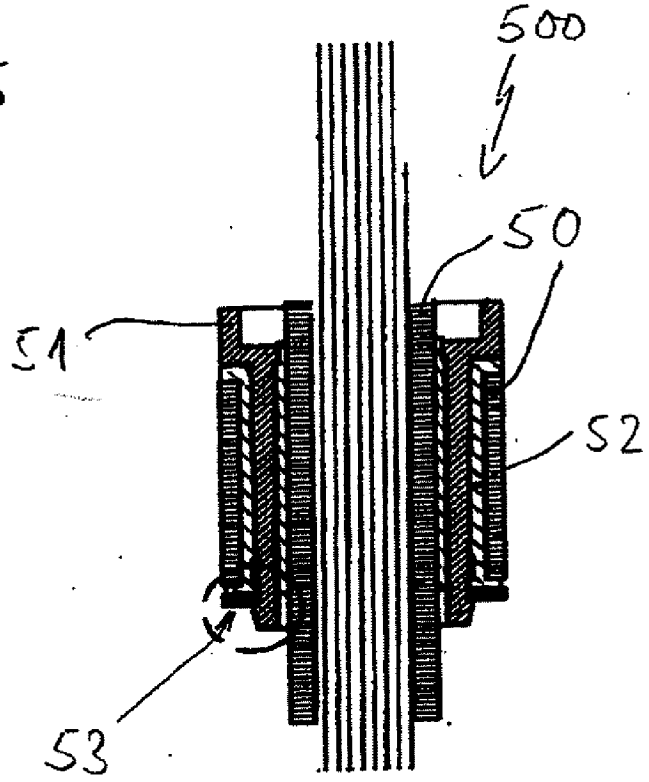

Fig. 6

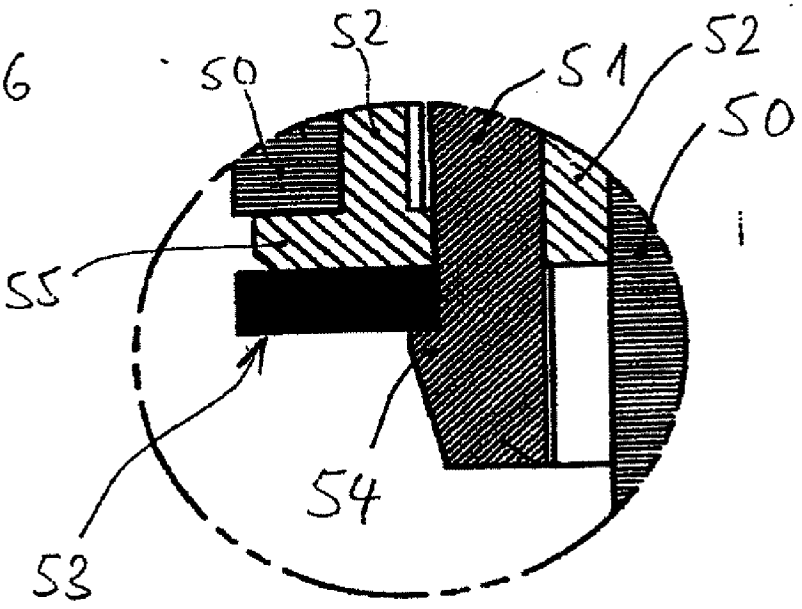

Fig. 7

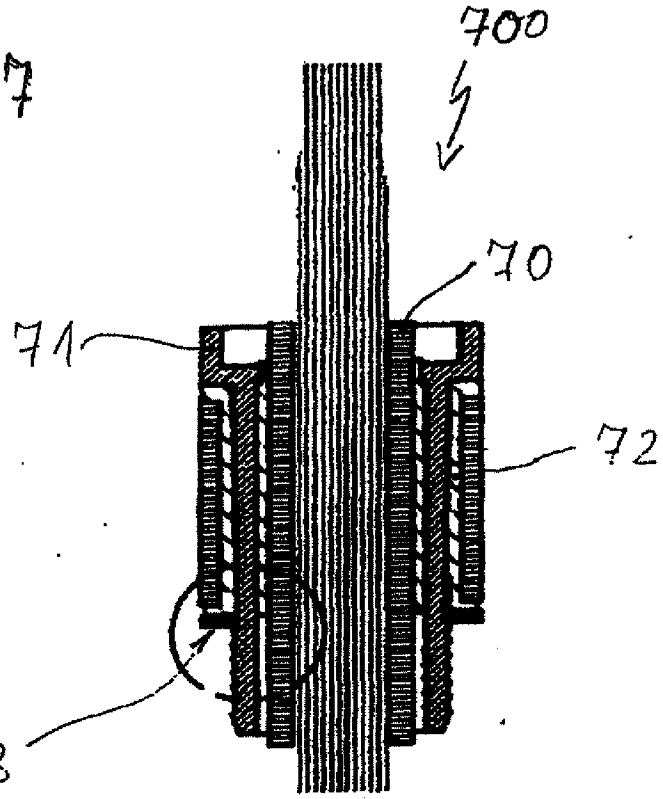

Fig. 8